

In this chapter you will learn about:

- ◆ Vitamin and mineral supplements.
- ◆ Nutritional ergogenic agents; hype versus reality.
- ◆ Risks associated with using performance enhancers.
- ◆ Ergolytic agents.

**Gaining** and maintaining physical fitness takes time and dedication. Often, to achieve these goals, people turn to various supplements based on their claims as performance enhancers. However, **no** supplement can replace the benefits of a well-planned exercise routine and a nutritionally-sound diet!

## Vitamin and Mineral Supplements

Taking a vitamin or mineral supplement may be something you are considering, especially if you find it difficult to eat a variety of foods. Due to the various functions of vitamins and minerals, the supplement industry has tried to encourage supplement use by physically active people. However, multivitamin and mineral supplements do not appear to enhance performance in healthy, well-nourished individuals. A multivitamin and mineral supplement is useful if:

- ◆ You have an existing vitamin or mineral deficiency.
- ◆ You have poor dietary habits. In this case, increase the amount of nutrient dense foods and food variety in your diet!
- ◆ You are exposed to extreme environmental conditions, such as cold climates or high altitudes ([Chapter 12](#)).

# Buying Vitamin and Mineral Supplements

Some facts to know before buying a supplement are:

- ◆ Amount of Nutrients - Take a multi-vitamin and mineral supplement that supplies nutrients in amounts close to the RDA/DRIs ([Chapter 2](#)). Excessive amounts of a single nutrient can cause a deficiency of other nutrients. Avoid “high potency” supplements.
- ◆ Natural Versus Synthetic Vitamins - Both forms can be used by your body, but if a supplement is labelled “natural” it costs more.
- ◆ Expiration Date - Avoid supplements that expire in 6 months.
- ◆ Stress tablets are a marketing ploy.
- ◆ Men should not take iron supplements, unless directed by their doctor.



## Nutritional Ergogenic Agents

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Taking performance-enhancing supplements is a personal choice. [Table 14-1](#) lists some popular ergogenic agents grouped by type (identified in bold), the research findings, and the potential side effects. However, this list is not complete as new supplements enter the market regularly. This table is designed to educate you as a consumer. Many of the ergogenic agents listed are classified as nutritional supplements. When marketed as a nutritional supplement, these substances are **not regulated by the Federal Drug Administration (FDA)**. Often this means that the performance claims and the risks associated with using these substances have not been thoroughly tested.

Other sources of information include the **Ergogenics Pamphlet** (<http://www.usuhs.mil/mim/ergopam.pdf>); the Alcohol Tobacco and Firearms web site at <http://www.ATF.treas.gov>; the Federal Drug Agency at <http://www.fda.gov> (select the “Food” icon); and the Federal Trade Commission at <http://www.ftc.gov> (search “consumer publications”). Be aware of substances that are banned by the military and various athletic associations.

**Table 14-1. Claims and Risks of Ergogenic Agents**

Type / Examples	Benefits / Risks / Side Effects
<b>Energy Enhancers</b> Inosine, Coenzyme Q10 (COQ10), Desiccated Liver, Bee Pollen	No benefits demonstrated; some may increase free radical production or cause allergic reactions.
<b>Fat Burners / Lean Body Mass Enhancers</b> L-Carnitine, Gamma Oryzanol, Ferulic Acid, Hydroxy-Methyl-Butyrate (HMB), Chromium Picolinate	No benefits demonstrated for many in this class. For HMB and chromium the research is inconclusive. Some may cause nausea, vomiting, cramps, and anemia. Chromium may cause DNA damage.
<b>Growth Hormone (GH) Releasers</b> Arginine, Lysine, Ornithine, Branched chain Amino Acids (Leucine, Isoleucine, Valine), Free Amino Acids, Dibenzozide, Cobamamide	Some benefits for Arginine, Lysine, and branched chain amino acids, but not the others. All may cause gastrointestinal (GI) upset, diarrhea, cramping, potential amino acid imbalances, and decreases in GH.
<b>CHO Sparers</b> 40-30-30, high fat/protein diets; Medium Chain Triglycerides (MCT); Ginseng; Lactate; Caffeine; Choline.	Some benefits reported for the diets; such diets may raise blood cholesterol and be a risk for heart disease. Some performance benefits for lactate and caffeine. No benefit demonstrated for others. Some may cause GI upset, allergic reactions, excitability, irritability, tremors, loss of concentration, nausea, and diarrhea.
<b>Testosterone Enhancers</b> Glandulars (grounded organs); Sapogenins (Smilax, Dioscorea, Trillium, Yucca, Sarsaparilla); Yohimbine; Boron; DHEA; Androstenedione, Andro, Androstenediol, Norandrostenediol; Steroids and steroid alternatives.	No benefits demonstrated; may cause testosterone production to decline and shrinking of the testicles; may cause light-headedness, aggression, nausea, vomiting, headaches, depression, lethargy, rashes, acne, and virilization in females. Some may increase risk of developing cancer. Andro group and other steroid alternatives are banned by the military.
<b>Intercellular Buffers</b> Phosphate Salts; Aspartate Salts (Magnesium/ Potassium); Citrate; Sodium Bicarbonate.	Some benefits demonstrated for citrate and sodium bicarbonate, benefits are questionable for others. May cause GI upset, diarrhea, nausea, and cramps.
<b>Octacosanol (Wheat Germ Oil)</b>	Some benefits demonstrated in reaction times but not aerobic capacity; may cause allergic reactions.
<b>Glycerol</b>	No benefits demonstrated; may cause cellular dehydration, nausea, vomiting, and diarrhea.

**Table 14-1. Claims and Risks of Ergogenic Agents**

Type / Examples	Benefits / Risks / Side Effects
<b>Omega-3 Fatty Acids</b>	No ergogenic effects have been demonstrated.
<b>Creatine</b>	Some performance benefits demonstrated during short-term, high intensity exercise, but benefits are negated if taken with caffeine.
<b>Tyrosine</b>	Some performance benefits demonstrated in mental tasks.
<b>Glutamine</b>	No performance benefits demonstrated.
<b>Glucosamine Sulfate with Chondroitin Sulphate</b>	Has potential for preventing and treating injuries, however is not endorsed by doctors due to the lack of research.
<b>Melatonin</b>	Benefits demonstrated; may cause sleepiness and fatigue at time of ingestion, but not upon awakening.

## Ergolytic Agents

Ergolytic agents are those substances which impair physical and/or mental performance. When using these substances, you are undoing the benefits gained through training.

**Table 14-2. Ergolytic Agents and Performance**

Type / Examples	Side Effects / Risks
<b>Alcohol</b>	Heavy drinking can cause severe dehydration and decrease performance.
<b>Stimulants</b> amphetamines, ephedrine	Banned by the military. These substances increase heart rate and blood pressure, can cause dizziness, stomach upset, irritability, insomnia, and death.
<b>Nicotine</b> Cigarettes or Smokeless Tobacco	Increases heart rate and blood pressure, leading to decreased performance.